



Dart Aerospace Ltd.
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D350-748-243TRN
Job Sheet 201056



Part No: D350-748-243TRN

Job Qty: 1 pcs

Part Name: Crosstube Installation, High Aft



Part Weight: 0 lbs

Status: New

Priority: Medium

Job Created: 9/23/19

Job Tracking No:

Due Date: 11/22/19

Created By: Jennifer Renwick

Type: Stock

Description:

Note: DWG REV A IPP Rev:A New Issue LL 12.05.08

Ship Via:

Bill of Materials

Job Routing

Op No	Operation	Qty	Start Date	Due Date	Standard		Workcenter/Supplier		Lead Time	Sign-off
					Setup Hrs	Run Hrs	Workcenter / Supplier			
100	Mori Seiki TL-40 - 1	1 pcs	11/22/19	11/22/19	1.00	3.57	Mori Seiki TL-40 - 1			DAS 662019/10/04
110	QC 2	1 pcs	11/22/19	11/22/19	0.00	0.00	QC 2 - 1		9-89	
							QC 2 - 12			
							QC 2 - 14			
							QC 2 - 17			
							QC 2 - 19			
							QC 2 - 2			
							QC 2 - 20			
							QC 2 - 22			
							QC 2 - 23			
							QC 2 - 25			
							QC 2 - 32			
							QC 2 - 33			
							QC 2 - 35			
							QC 2 - 39			
							QC 2 - 4			
							QC 2 - 40			
							QC 2 - 44			
							QC 2 - 45			
							QC 2 - 48			
							QC 2 - 49			
							QC 2 - 50			
							QC 2 - 51			
							QC 2 - 52			
							QC 2 - 57			
							QC 2 - 62			
							QC 2 - 63			

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9/23/2019

[Dart Hawkesbury] Job Sheet - Renwick, Jennifer

				QC 2 - 8	DAS
				QC 2 - 66	66 2019/10/04
				QC 2 - 64	9-89
				QC 2 - 65	
				QC 2 - 5	
				QC 2 - 71	
				QC 2 - 73	
				QC 2 - 69	DAS
120	Mori Seiki TL-40 - 1 - B4B	1 pcs	11/22/19	1.00 3.57	Mori Seiki TL-40 - 1 - B4B
130	QC 2	1 pcs	11/22/19	0.00 0.00	QC 2 - 1
					QC 2 - 12
					QC 2 - 14
					QC 2 - 17
					QC 2 - 19
					QC 2 - 2
					QC 2 - 20
					QC 2 - 22
					QC 2 - 23
					QC 2 - 25
					QC 2 - 32
					QC 2 - 33
					QC 2 - 35
					QC 2 - 39
					QC 2 - 4
					QC 2 - 40
					QC 2 - 44
					QC 2 - 45
					QC 2 - 48
					QC 2 - 49
					QC 2 - 50
					QC 2 - 51
					QC 2 - 52
					QC 2 - 57
					QC 2 - 62
					QC 2 - 63
					QC 2 - 8
					QC 2 - 66
					QC 2 - 64
					QC 2 - 65
					QC 2 - 5
					QC 2 - 71
					QC 2 - 73
					QC 2 - 69
140	QC 8	1 pcs	11/22/19	0.00 0.00	QC 8 - 12
					QC 8 - 14
					QC 8 - 17
					QC 8 - 20
					QC 8 - 25
					QC 8 - 3
					QC 8 - 32
					QC 8 - 33
					QC 8 - 35
					QC 8 - 39
					QC 8 - 4

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				QC 8 - 44	
				QC 8 - 45	
				QC 8 - 49	
				QC 8 - 58	
				QC 8 - 8	
				QC 8 - 9	
				QC 8 - 68	
				QC 8 - 67	
				QC 8 - 1 (A)	DAS
				QC 8 - 47	47 19-10-17
				QC 8 - 40	9-89
				QC 8 - 52	
				QC 8 - 23	
				QC 8 - 57	
				QC 8 - 76	
				QC 8 - 61	
150 Crosstubes - 2 - B4B	1 pcs	11/22/19	0.00 0.81	Crosstubes - 1 - B4B	
				Crosstubes - 2 - B4B	
				Crosstubes - 3 - B4B	
				Crosstubes - 4 - B4B	TE 19-10-21
190 Packaging 3-1 - Stock - B4B	1 pcs	11/22/19	0.00 0.00	Packaging 3 - 1 - B4B	
				Packaging 3 - 2 - B4B	
				Packaging 3 - 3 - B4B	
				Packaging 3 - 4 - B4B	
				Packaging 3 - 5 - B4B	
				Packaging 3 - 6 - B4B	
				Packaging 3 - 7 - B4B	
				Packaging 3 - 8 - B4B	
				Packaging 3 - 9 - B4B	
				Packaging 3 - 10 - B4B	
				Packaging 3 - 11 - B4B	
				Packaging 3 - 12 - B4B	
				Packaging 3 - 13 - B4B	
				Packaging 3 - 14 - B4B	
				Packaging 3 - 15 - B4B	
				Packaging 3 - 16 - B4B	
				Packaging 3 - 17 - B4B	
				Packaging 3 - 18 - B4B	
				Packaging 3 - 19 - B4B	
				Packaging 3 - 20 - B4B	
				Packaging 3 - 21 - B4B	
				Packaging 3 - 22 - B4B	
				Packaging 3 - 23 - B4B	
				Packaging 3 - 24 - B4B	TE 19-10-21
				Packaging 3 - 25 - B4B	
				Packaging 3 - 26 - B4B	
				Packaging 3 - 27 - B4B	
				Packaging 3 - 28 - B4B	
				Packaging 3 - 29 - B4B	
				Packaging 3 - 30 - B4B	
				Packaging 3 - 31 - B4B	
				Packaging 3 - 32 - B4B	
				Packaging 3 - 33 - B4B	
				Packaging 3 - 34 - B4B	

9/23/2019

[Dart Hawkesbury] Job Sheet - Renwick, Jennifer

Packaging 3 - 35 - B4B

Packaging 3 - 36 - B4B

200 QC 21 - SA

1 pcs

11/22/19

0.00 0.00

QC 21 - SA - 21

QC 21 - SA - 70

QC 21 - SA - 53

DAS

21

9-35

OCT 21 2019

Part Op 100 - TL-40 (Mori Seiki CNC Lathe Large) 1-Cut tube on chop saw, leave extra mat'l for facing and install plugs 350-241
 Descriptions: on both ends. 2-Face both sides of tube. 3- Turn program 02000 section on both side as per folio FB468. 4- Turn program
 03000 section on both side as per folio FB468. 5- Blend transsition lines only with belt sander 60 grit. Folio

rev: A Dwg rev: A

110 - (QC2- Inspect parts off machine FAI/FAIB)

120 - TL-40 (Mori Seiki CNC Lathe Large) 1- Turn program 04000 section on both side as per folio FB468. 2- Turn
 program 05000 section on both side as per folio FB468. 3- Blend transsition lines only with belt sander 60 grit. 4-Scribe
 part # as per Dwg D350-748-243. Folio rev: A Dwg rev: A

130 - (QC2- Inspect parts off machine FAI/FAIB) PERFORME ULTRASONIC MEASURMENT

140 - (QC8- Inspect parts - second check)

150 - Crosstubes-2 (Crosstubes) 1-Grind machining marks

190 - Identify and stock in kanban rack

200 - (QC21- Final Inspection - Work Order Release)

Job BOM

Part / Item	Component Name	Quantity	Operation	Container
D6021-125	Crosstube Material - 17-4Ph SS	1 pcs (1 ea)	100-Mori Seiki TL-40 - 1	F151690

Job Allocations

Operation	Component Part	Required	Inventory	Allocated
100-Mori Seiki TL-40 - 1	D6021-125	1	31	0

Part Specifications

Specifications could not be found.

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Container No: S219909



Part: D350-748-243TRN

Job No: 201056

Serial No/Batch: S219909

Revision: A

Inspector:

Exp Date:

Instructions:

Dart Aerospace Ltd.
 1270 Aberdeen Street
 Hawkesbury, ON K64 1K7
 CANADA
 TEL.: 1 813 632-5200
 Email: sales@dartaero.com
 www.dartaerospace.com

Date: 10/04/19

7

DART AEROSPACE LTD	Work Order:	201056
Description: Crosstube Assembly (AS350/355 High Aft SS)	Part Number:	D350-748-243
Inspection Dwg: D350-748-243 Rev: A		Page 1 of 2

FIRST ARTICLE INSPECTION CHECKLIST

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+/-0.005	2.243	✓		CNC-04	
	2.180	+0.005/-0.000	2.183	✓			
	2.180	+0.005/-0.000	2.180	✓			
	2.208	+0.005/-0.000	2.211	✓			
	2.234	+0.005/-0.000	2.238	✓			
	2.253	+0.005/-0.000	2.257	✓			
	2.272	+0.005/-0.000	2.277	✓			
	2.299	+0.005/-0.000	2.304	✓			
	0.063	+/-0.010	.063	✓		CNC-08	
	5.25	+/-0.060	5.255	✓			
	R0.063	+/-0.010	.063	✓		RG	
	R0.50	+/-0.030	.500	✓		"	
SIDE B	2.240	+/-0.005	2.245	✓		Cnc 04	
	2.180	+0.005/-0.000	2.185	✓			
	2.180	+0.005/-0.000	2.182	✓			
	2.208	+0.005/-0.000	2.213	✓			
	2.234	+0.005/-0.000	2.239	✓			
	2.253	+0.005/-0.000	2.258	✓			
	2.272	+0.005/-0.000	2.277	✓			
	2.299	+0.005/-0.000	2.304	✓			
	0.063	+/-0.010	.063	✓		Cnc 08	
	5.25	+/-0.060	5.256	✓		Cnc 08	
	R0.063	+/-0.010	.063	✓		RG	
	R0.50	+/-0.030	.500	✓		RG	
	124.70	+/-0.060	124.735	✓		Tape	

Item	Qty	Part Number	Description
1	X	D350-748-243	CROSSTUBE ASSEMBLY (AS 350/355 HI AFT)
2	1	D8021-125	CROSSTUBE
3	2	D3502-1	SUPPORT
4	2	D3123-7	CLAMP CUSHION
5	1	AETC-1032	INSERT
6	2	MS21920-20	CLAMP
		OR MS21920-21/-22	(PER DART SPEC. M-MS21920-20/-21/-22)
7	1	NAS114RC353R	WASHER (OR AN680C10)
8	1	NAS1835-3-8	SCREW (OR MS51855-53)
9	4/R	PROSEAL 880 B-2	SEALANT, AMS-S-8802 CLASS B-2

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D8021-125
FINISHED LENGTH AFTER TURNING = 124.70±0.08 (AFTER BENDING/TRIMMING = 122.70 REF)
- 2) FINISH: PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCE: PER DART QSI 018 UNLESS OTHERWISE NOTED.
WALL THICKNESS ECCENTRICITY PER DART QSI 035 7.2
MIN. ALLOWABLE WALL IS 4.020 FROM NOMINAL
UNITS: INCHES UNLESS OTHERWISE NOTED.
- 4) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 5) IDENTIFICATION: DART PART NUMBER "D350-748-243" AND BATCH NUMBER ON INSIDE OF CUFF
- 6) WEIGHT: 29.85 lbs
- 7) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.280 HOLE.
- 8) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 9) TURNING
10) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BENDING
11) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES PER SIDE. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 8% BASED ON O.D. ON TOP HALF OF BEND, AND 8% ON BOTTOM HALF OF BEND.
12) MAX AMPLITUDE OF RIPPING ALONG BENT PORTION OF THE TUBE IS 0.030 (ZN A1-3)
13) MAX TWIST: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.38 (ZN C1-3).

- #### ASSEMBLY
- 14) TO INSTALL D3502-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.02" TO 0.05" THICK LAYER OF PROSEAL 880 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
 - 15) TORQUE CLAMPS 80 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 880 SEALANT HAS CURED FOR 72 HOURS.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 201056

DEO ATTACHED

RELEASED

2015 MAR 18

RELEASED

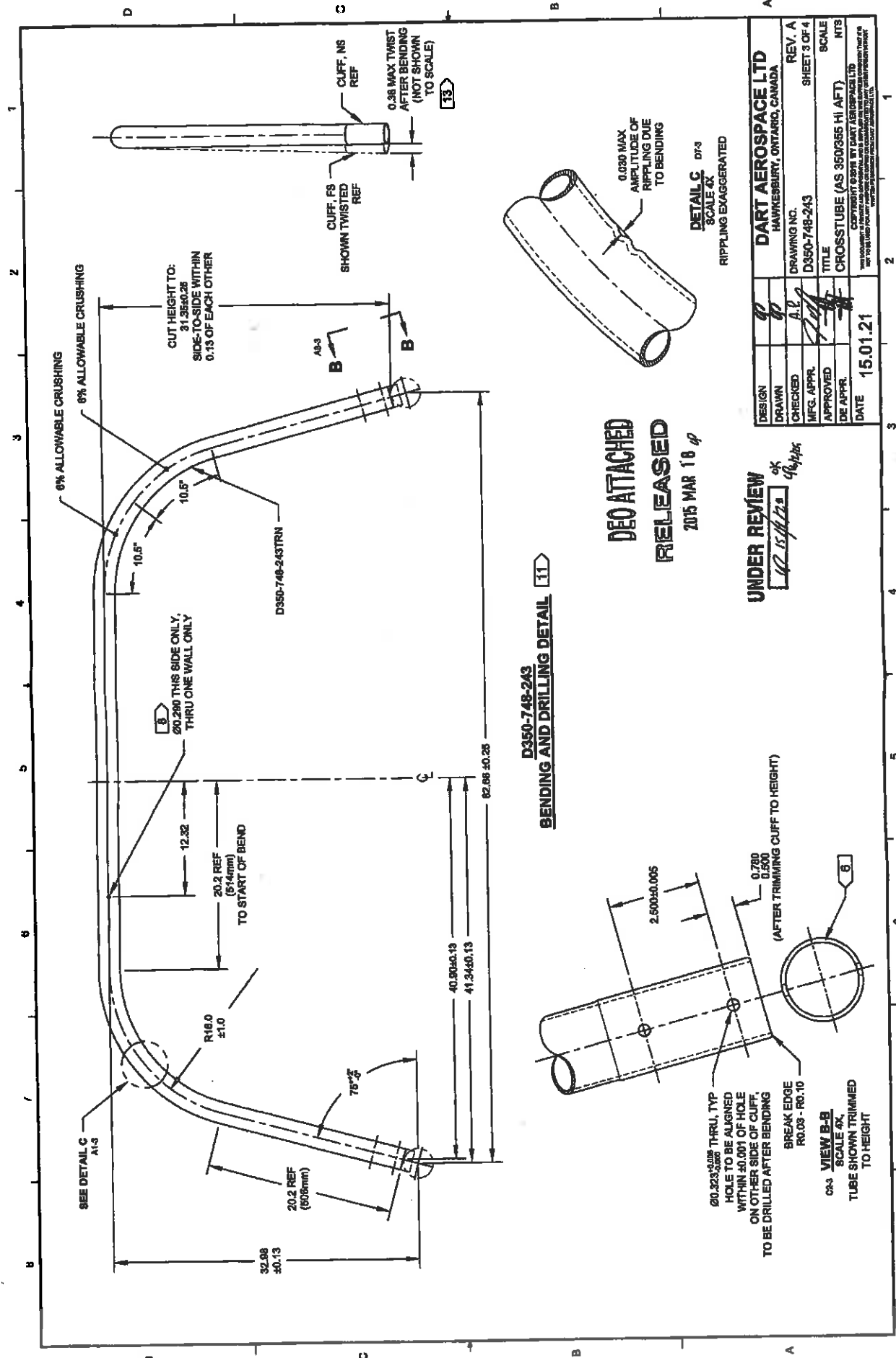
2015 MAR 18

UNDER REVIEW

15/14/15

15/14/15

A	NEW ISSUE	CP	BY	DATE
DESIGN	15/14/15	15/14/15	15/14/15	15.01.21
DRAWN	15/14/15	15/14/15	15/14/15	15.01.21
CHECKED	15/14/15	15/14/15	15/14/15	15.01.21
MEG. APPR.	15/14/15	15/14/15	15/14/15	15.01.21
APPROVED	15/14/15	15/14/15	15/14/15	15.01.21
DE APPR.	15/14/15	15/14/15	15/14/15	15.01.21
DATE	15.01.21			
DESCRIPTION				
DART AEROSPACE LTD				
HAWKESBURY, ONTARIO, CANADA				
DRAWING NO.				
D350-748-243				
REV. A				
SHEET 1 OF 4				
TITLE				
CROSSTUBE (AS 350/355 HI AFT)				
SCALE				
NTS				
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D350-748-243

BENDING AND DRILLING DETAIL 11

DEO ATTACHED
RELEASED
2015 MAR 18

UNDER REVIEW

15 MAR 15 15:12:15

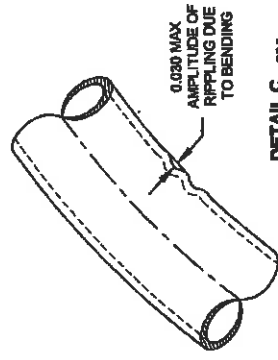
Ø0.323_{±0.005} THRU, TYP
HOLE TO BE ALIGNED
WITHIN ±0.001 OF HOLE
ON OTHER SIDE OF CUFF.
TO BE DRILLED AFTER BENDING

BREAK EDGE
R0.09 - R0.10

VIEW B-B
SCALE 4X
TUBE SHOWN TRIMMED
TO HEIGHT

(AFTER TRIMMING CUFF TO HEIGHT)

DETAIL C
SCALE 4X
RIPPLING EXAGGERATED



CUFF, FS
SHOWN TWISTED
REF

CUFF, NS
REF

0.38 MAX TWIST
AFTER BENDING
(NOT SHOWN
TO SCALE)

9% ALLOWABLE CRUSHING

CUT HEIGHT TO:
31.3550.28
SIDE-TO-SIDE WITHIN
0.13 OF EACH OTHER

Ø0.280 THIS SIDE ONLY,
THRU ONE WALL ONLY

20.2 REF
(514mm)
TO START OF BEND

32.08
±0.13

R18.0
±1.0

20.2 REF
(508mm)

75°

40.90±0.13

41.24±0.13

82.86 ±0.26

DRAWING NO. D350-748-243	TITLE CROSSTUBE	REV. A	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D350-748-243-A-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN qp	CHECKED AS		MFG. APPR. [Signature]	APPROVED [Signature]		DE APPR. [Signature]	
DATE 15.11.18	DATE 15.11.18		DATE 15.02.19	DATE FEB 19 2016		DATE 2016.02.19	

AMEND NOTE 2 (SHEET 1) AS FOLLOWS:

2) FINISH: PREPARE SURFACE PER DART QSI 005 4.1.4
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2

OR

POWDER COAT WHITE (4.3.5.2) PER DART QSI 005 4.3

RELEASED
2016-02-26
EN 16-534



Entered: _____ Date: _____

WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

Route update only ☐

NCR No. _____

Job: _____

Part No. _____

DISPOSITION

Rework ☐ ☐ ☐
Scrap ☐ ☐ ☐
Use-as-is ☐ ☐ ☐

DEPARTMENT/PROCESS

Cross tube ☐ ☐ ☐
Small Fab ☐ ☐ ☐
Finishing ☐ ☐ ☐

Eng. (Non-AW) ☐ ☐ ☐
Prod. Eng. Coord. ☐ ☐ ☐
Rec/Store/Packaging ☐ ☐ ☐

Skid-tube ☐ ☐ ☐
Machining ☐ ☐ ☐
Large Fab ☐ ☐ ☐

Engineering ☐ ☐ ☐
Water Jet ☐ ☐ ☐
Supplier ☐ ☐ ☐
Quality ☐ ☐ ☐

MRB (QS1042)

Sequence #: _____

QTY Affected: _____

Description Work Order Deviation

Disposition

Completed By

Lead hand / Supervisor

QC / QA Coordinator

Root Cause

Operator ☐ ☐ ☐
Manufacturing Process ☐ ☐ ☐
Equip/Tooling ☐ ☐ ☐
Handling/Preservation ☐ ☐ ☐
Material ☐ ☐ ☐
Product Improvement ☐ ☐ ☐
Process Improvement ☐ ☐ ☐
Human Factors ☐ ☐ ☐

FAULT CATEGORY

Pressure/Forced ☐ ☐ ☐
Bending ☐ ☐ ☐
Crushing ☐ ☐ ☐
Cracks ☐ ☐ ☐
Crimp/Kink/Ripple/Wave/Twist ☐ ☐ ☐
Marks/Chatter ☐ ☐ ☐
Mislabeled ☐ ☐ ☐
Contamination ☐ ☐ ☐
Misaligned/off center ☐ ☐ ☐
BOM/Route ☐ ☐ ☐
Broken/Damage/Defect ☐ ☐ ☐
Incomplete/Unclear Instructions ☐ ☐ ☐
Drill Holes ☐ ☐ ☐
Fit/Function ☐ ☐ ☐

Power Loss/Surge ☐ ☐ ☐
Folio/Program ☐ ☐ ☐
Grain Direction ☐ ☐ ☐
Weld ☐ ☐ ☐
Wrong Stock Pulled ☐ ☐ ☐
Out of Sequence ☐ ☐ ☐
Off-set/Set-up ☐ ☐ ☐
Positioned Wrong ☐ ☐ ☐
Outside Tolerance ☐ ☐ ☐
Drawing ☐ ☐ ☐
Finish ☐ ☐ ☐
Part Lost/Missing ☐ ☐ ☐
Misread ☐ ☐ ☐

Other/Details: